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| 10/092,577 | 03/08/2002 | Manwinder Singh | 4320-395 | 1428 |
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| BERESKIN AND PARR 40 KING STREET WEST BOX 401 TORONTO, ON M5H 3Y2 CANADA | | | MENON, KRISHNAN S | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1723 | |

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/092,577

Applicant(s)

SINGH ET AL.

Examiner

Krishnan S. Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-10 and 12-16 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 5-10 and 12-16 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 5-10 and 12-16 are pending after the applicant's response filed on 3/2/05.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 5-8,10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by,
or in the alternative, under 35 USC 103(a) as obvious over Cote et al (US
5,607,593).

Cote et al teaches a water filtering process comprising providing a tank (1, fig 1) containing filtering membranes (3), introducing feed water and keeping the modules submerged (4; col 9 lines 20-25), withdrawing filtered permeate (10) and retentate (28), introducing a **first gas** in the water in the tank in bubbles which rise past the membrane to inhibit membrane fouling (col 4 lines 18-25, col 3 lines 27-32, col 5 lines 53-55, col 4 line 66 – col 5 line 13, and col 7 lines 37-58), collecting a second gas consisting of gases contained in the bubbles (col 4 lines 32-60; col 9 lines 3-5; hood 12 in fig 1). The first gas would consist of second gas and air because first gas is introduced as bubbles by the claim and the second gas is defined as “gases in the bubbles after they have risen past the membrane”, and air is bubbled through as indicated in col 5 lines 45-60. Re the implied recycling in the claim, Cote teaches recycling in col 4 lines 45-48 –

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gases are recovered and re-injected. In claim 6, first gas includes carbon dioxide' is an inherent property of the system because the CO₂ is part of the "gases contained in the bubbles after they have risen past the membrane", which is through water, and the oxidation of the biodegradables (col 6 lines 22-28) would inherently produce gases, typically carbon dioxide. When the prior art device (in this instance, a device that bubbles air in water) is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986). The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." In re Napier, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

With regard to the newly added steps (g), (h) and (i) in claim 1: collecting air from the atmosphere – col 5 lines 45-60 and figs. 7 and 8 teach adding air in to the ozone circuit. Mixing collected air with second gas – fig 7 and 8 does depict mixing collected air with second gas. Exhausting portion of second gas: the system inherently exhausts portion of second gas – the portion of bubbles that escapes from the water in the reactor 1.

Re claim 7, the second gas is 80% of the mixture implies 80% of the gas streams are recycled. Cote does not specifically teach how much of the gases are recycled in

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col 4 lines 45-48. However, this would be a result-effective variable, and can be optimized on process economics and contamination levels in the second gases. The same is true for claim 12.

Claim 8: scaling tendencies is an inherent property of the feed water.

Regarding claim 10, Cote teaches adding coagulants to the feed water in the tank (col 1 lines 20-25; col 2 lines 29-35)

2. Claims 5-8,10,12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 USC 103(a) as obvious over Ishida et al (US 5,437,787) (submitted by applicant in an IDS under 37 CFR 1.97(c) on 3/2/05).

Claim 5: Ishida teaches a process of filtering feed water (figures, abstract; ref teaches generic "liquid"; and water is a liquid) with submerged filtering modules; introducing feed water (3), withdrawing permeate (14), withdrawing retentate (to 21 – regeneration unit), introducing a first gas (16), collecting second gas (19), and mixing collected gas with fresh air (col 4 lines 4-5). Exhausting portion of second gas is inherent in the process: since the reference teaches a closed system, any fresh air intake has to be balanced by a corresponding release of the second gas. "[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); In re Lamberti, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976).

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Claims 6 and 7: first gas includes carbon dioxide in concentration greater than that of air: inherent. If applicant has CO₂ in the system, so would the reference because of same process. Second gas 80% or more of the mixture – the process of the reference is capable of having total recirculation of the gases to admitting any amount of fresh air (col 4 lines 4-5).

Claim 8: Feed water has scaling tendencies – inherent characteristic of the feed water.

Claim 10: adding coagulant – see col 1 lines 10-30 – adsorbents, ion exchange, etc.

Claim 12: some of the gases collected, some vented – inherent in the process as explained in claim 5.

Claim 13: steps of drawing air from the atmosphere by vacuum induced flow: Ishida teaches a blower, the suction side of it (19) is capable of being at below atmosphere pressure, or vacuum. Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cote (593) in view of Dickerson et al (US 6,221,254 B1) and Cote et al (US 6,245,239 B1).

Cote'593 teaches all the limitations of claim 5. Claim 9 adds further limitations, which are not taught by Cote. Dickerson teaches using recycled CO₂ in a concentration greater than in air (col 6 lines 30-35; abstract; col 5 lines 4-59; claim 1; col 9 lines 33-37). Cote'239 teaches the superficial velocity as between 0.01 – 0.015 for a membrane aeration system. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Dickerson and Cote'239 in the teaching of Cote'593 to have improved filtration including pH control below 8, coagulation, precipitation, and then floatation of biological contaminants in the water using microfine bubbles of CO₂ gas (see Dickerson col 5 lines 4-60; with use of filters in col 9 lines 55-65), and for maintaining the membrane surface clean as taught by Cote'239. Regarding the pH being maintained below 8 when the Langlier Scaling index >0.5, pH being maintained at all times in the reference encompasses this limitation. The scaling index >0.5 is only an inherent property of the wastewater.

Claim 13 recites step for the function of creating the second gas, which is provided by the tightness of a hood over a tank. Cote'593 teaches a hood for collection

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of second gas – 12, fig 1, but does not teach the specifics of recycling the second gas.

Means for vacuum induced recycling flow of second gas is taught by Dickerson – see col 9 lines 32-37 and the figure. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Dickerson in the teaching of Cote'593 for recycling the second gas pH control, coagulation, etc as taught by Dickerson.

4. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dickerson et al (US 6,221,254 B1) in view of Cote (593) and Cote (239).

Claim 14: Dickerson teaches a process for treating water (having scaling tendencies of water - is inherent in water) by providing a tank (10), introducing feed water into the tank (line 1) (Langlier scaling index >0.5 is an inherent property of the water), introducing a gas into the tank in bubbles and increasing the concentration of carbon dioxide in the gas by mixing carbon dioxide collected from the bursting bubbles into the gas (see CO₂ recycle in col 5 lines 19-24 and fig 1).

Dickerson does not teach tank containing filtering membrane modules, withdrawing permeate and retentate from the tank, bubbles rising past membrane to inhibit fouling of the membrane, and superficial velocity of at least 0.01 m/s. Cote '593 teaches a process for treating water by providing a tank with submerged membrane and gas bubbles for inhibiting membrane fouling (see figures). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Cote'593 in the teaching of Dickerson for water purification to obtain potable water more efficiently as taught by Cote'593 (col 1 line 5 col 2 line 20). Gas superficial velocity at least 0.01 m/s

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is taught by Cote 239– col 6 lines 45-60. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Cote 239 in the teaching of Dickerson because Dickerson does not teach the gas flow rate required. One would also use the velocity taught by Cote'239 to keep the membrane clean as taught by Cote'239.

Claim 15: pH, 8 – see Dickerson abstract.

Claim 16: water in the tank has free surface in communication with atmosphere – see Cote'593: tank has a free head-space above the liquid.

5. Claims 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (787) in view of Dickerson et al (US 6,221,254 B1) and Cote et al (US 6,245,239 B1).

Ishida teaches all the limitations of claim 5. Claim 9 adds further limitations, which are not taught by Ishida. Dickerson teaches using recycled CO₂ in a concentration greater than in air (col 6 lines 30-35; abstract; col 5 lines 4-59; claim 1; col 9 lines 33-37). Cote'239 teaches the superficial velocity as between 0.01 – 0.015 for a membrane aeration system. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Dickerson and Cote'239 in the teaching of Cote'593 to have improved filtration including pH control below 8, coagulation, precipitation, and then floatation of biological contaminants in the water using microfine bubbles of CO₂ gas (see Dickerson col 5 lines 4-60; with use of filters in col 9 lines 55-65), and for maintaining the membrane surface clean as taught by Cote'239. Regarding the pH being maintained below 8 when the Langlier Scaling index >0.5, pH being

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maintained at all times in the reference encompasses this limitation. The scaling index >0.5 is only an inherent property of the water.

6. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida (787) in view of Cote et al (US 6,245,239 B1).

Claim 14: Ishida teaches a process of filtering feed water (figures, abstract; ref teaches generic "liquid"; and water is a liquid) with submerged filtering modules; introducing feed water (3), withdrawing permeate (14), withdrawing retentate (to 21 – regeneration unit), introducing a first gas (16), collecting second gas (19), and mixing collected gas with fresh air (col 4 lines 4-5). Exhausting portion of second gas is inherent in the process: since the reference teaches a closed system, any fresh air intake has to be balanced by a corresponding release of the second gas. The mixing of carbon dioxide from the bursting bubbles into the gas is also inherent because any carbon dioxide in the bursting bubbles would mix with the recirculated gases, and carbon dioxide coming out of the bursting bubbles is an inherent property of the water system. "[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); In re Lamberti, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976). [T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on

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prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Langlier scaling index of >0.5 is an inherent property of the feed water, and such a water is covered under the generic "liquid" taught by Ishida. Ishida does not teach the gas bubble velocity as at least 0.01 m/s. Cote'239 teaches the superficial velocity as between 0.013 – 0.015 for a membrane aeration system (Cote col 6 lines 45-60). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Cote in the teaching of Ishida because Ishida does not teach any specific bubble velocity.

Claim 15: maintaining the pH to less than 8 by concentration of the carbon dioxide: pH of the water would drop to less than 8 inherently as claimed – same process in the reference as claimed. The claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d, 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

Claim 16: water in the tank has a free surface in the Ishida ref: there is head-space in the tank – see figures. It is also in communication with the atmosphere when fresh air is introduced in to the system (col 4 lines 4-5).

Response to Arguments

Applicant's arguments filed 3/2/05 have been fully considered but they are not persuasive.

In response to the argument about claim 5 step (e) – step (e) recites a gas and ozone is a gas. Further more, ozone in most part is air. Re step (h) – mixing air: this has been discussed several times in the past office actions.

With regard to the comment that lines 45-60 of the reference only teaches alternate uses of the compressor: see the lines captured below:

According to an alternative embodiment of the invention, the installation also has an air compressor, enabling the injection of pressurized air into said permeate-recovery chamber, that could be used to:

- test the integrity of the membranes;
- push the permeate into the membranes at the time of the backwashing;
- increase the flow of air into the ozone-injection circuit or into a separate circuit to improve the efficiency of the washing and flotation operations;
- drive the floating material to the surface of the reactor.

It can be noted that, for the latter two functions, the ozone is injected into the treatment chamber.

Arguments re claim 7: Claim recites recycling 80%, which would be a result-effective variable. How much to recycle in the Cote process would depend on the amount of ozone remaining in the recycle stream, and to maintain the ozone concentration in the stream.

Arguments re claims 9 and 13: motivation to combine is clearly stated in the rejection of claim 9. Re the argument that there is no suggested steps for flow of air as

in claim 13, see the rejection, and also the captured paragraph above, in which the compressor provides air in the ozone circuit.

With respect to the arguments about the lack of teaching of combining the Dickerson ref with the Cote ref, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The rest of the arguments are already addressed above or in the rejection.

Conclusion

Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 3/2/05 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609(B)(2)(i). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan S. Menon
Patent Examiner
3/30/05


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